*भारतीय मानक*
*Indian Standard*

**IS 17358 (Part 2) : 2020**

# कृषि वस्त्रादि — कृषि और बागवानी प्रयोजनों के लिए बाड़ जाल — विशिष्टि

## भाग 2 एकतन्तु और टेप एवं एकतन्तु यार्न के मेल से निर्मित बाड़ जाल

# Agro Textiles — Fencing Nets for Agriculture and Horticulture Purposes — Specification

## Part 2 Fencing Nets Made from Mono Filament Yarns and Combination of Tape and Mono Filament Yarns

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Technical Textiles for Agro-tech Sectional Committee, TXD 35

## FOREWORD

This Indian Standard (Part 2) was adopted by the Bureau of Indian Standards, after the draft finalized by the Technical Textiles for Agro-tech Sectional Committee had been approved by the Textile Division Council.

Fencing is being provided to keep the stray animal, unwanted person etc. away from agriculture, horticulture, forest or other areas. Additionally, it also provides the aesthetic to the fenced area and also helps in defining boundaries and better organization of any specified place. Monofilament fencing nets are a good alternate to galvanized metal fencing and have an advantage of light weight, easy to install and no problem of corrosion.

The composition of the Committee responsible for the formulation of this standard is given in Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard*

# AGRO TEXTILES — FENCING NETS FOR AGRICULTURE AND HORTICULTURE PURPOSES — SPECIFICATION

## PART 2 FENCING NETS MADE FROM MONO FILAMENT YARNS AND COMBINATION OF TAPE AND MONO FILAMENT YARNS

### 1 SCOPE

This standard (Part 2) prescribes constructional and other performance requirements for fencing nets manufactured from mono filament yarns and combination of tape and mono filament yarns for agriculture, horticulture, forestry, animal husbandry (poultry), purposes in protecting from stray animals, for restricted entry.

### 2 REFERENCES

The standards listed in Annex A contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

### 3 TERMINOLOGY

For the purpose of this standard the definitions given in IS 16366 shall apply.

### 4 MATERIALS

#### 4.1 HDPE Monofilament

Monofilament yarn shall be manufactured from HDPE granules, which shall be UV stabilized by adding suitable UV stabilizer. The linear density of the monofilament yarn used for the manufacture of fencing nets shall be 35.56 tex (320 denier). As agreed to between the buyer and the seller, coloured monofilament yarn shall be manufactured using colour master batch. The denier of HDPE monofilament yarn used in the manufacture of fencing nets shall be subjected to the following tolerances:

a) ± 10 percent on individual value; and

b) ± 5 percent on average.

**4.1.1** The heat shrinkage of the monofilament yarn at 60°C shall not exceed 5 percent when subjected to the specified temperature for a period of 10 min in an air circulating oven. The heat shrinkage of the monofilament yarn at 95°C shall not exceed 8 percent when subjected to the specified temperature for a period of 10 min in hot water bath.

#### 4.2 HDPE Tapes

Tapes shall be manufactured from HDPE granules, which shall be UV stabilized by adding suitable UV stabilizer. The width of the tape used in the fabric shall be 1.70 ± 0.2 mm and linear density of the tape shall be 35.56 tex (320 denier). As agreed to between the buyer and the seller, coloured tapes shall be manufactured using colour master batch. The denier of HDPE tape used in the manufacture of shade nets shall be subjected to the following tolerances:

a) ± 10 percent on individual value; and

b) ± 5 percent on average.

**4.2.1** The heat shrinkage of the tape at 60°C shall not exceed 5 percent when subjected to the specified temperature for a period of 10 min in an air circulating oven. The heat shrinkage of the tape at 95°C shall not exceed 8 percent when subjected to the specified temperature for a period of 10 min in hot water bath.

### 5 MANUFACTURE

#### 5.1 Fabric

The fabric used in the manufacture of fencing nets shall be knitted on the warp knitting machines and shall have a width as per the agreement between the buyer and the seller. A tape of 1.70 ± 0.1 mm width or monofilament yarn of suitable diameter having the name of the manufacture and GSM shall be provided at one end of the fabric which shall run through the complete length of the roll for identification of manufacture.

#### 5.2 Eyelet

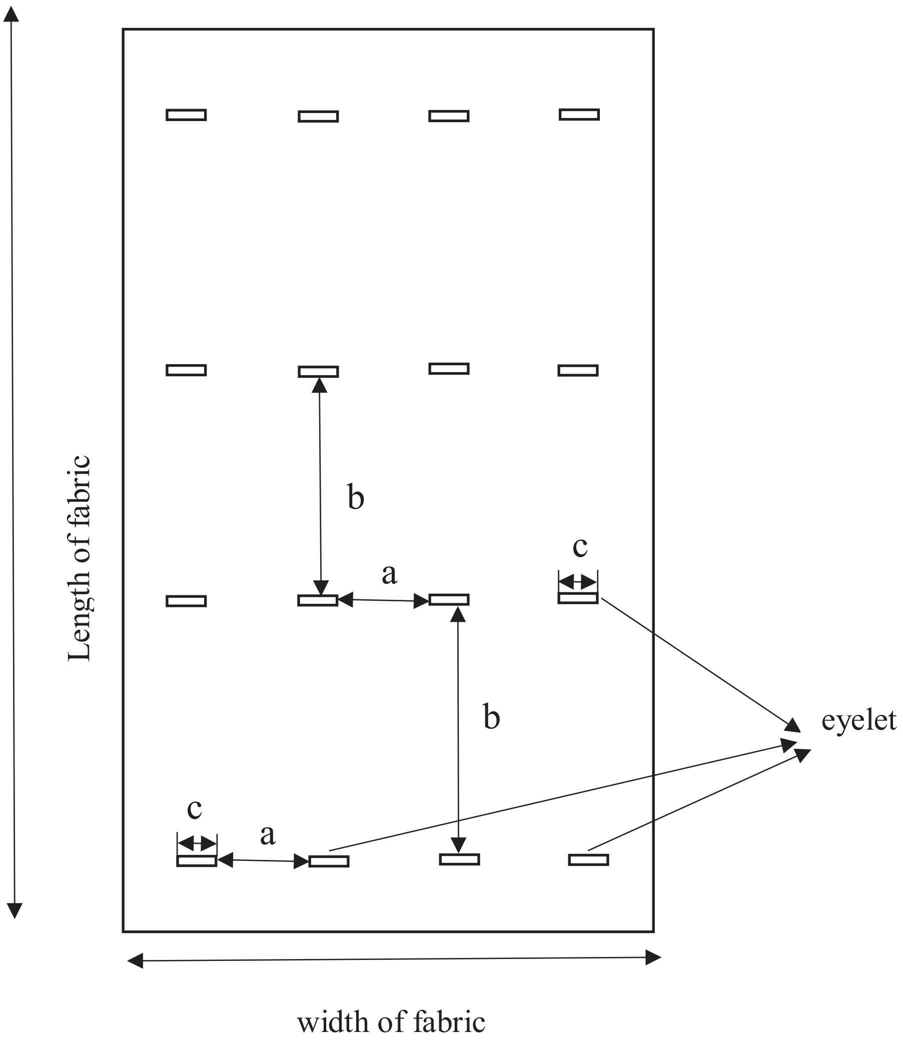
**5.2.1** Eyelets shall be provided during knitting along the width of the net after every 1 m length or as agreed between the buyer and the seller. Length of the eyelet shall be 20 ± 5 mm. Eyelet to eyelet edge distance across the width of the net shall be 45 ± 5 mm or as agreed between the buyer and the seller. The line diagram showing the location of eyelets across width and length of the fabric is shown in Fig. 1.

**5.2.2** Location of the eyelet shall be between 6th and 7th pillar.

**5.2.3** For reinforcement of the eyelets, minimum double yarn in the warp (course) shall be used in minimum 3 pillars on both sides of eyelet.

**5.3 Colour**

The colour or a mixture of colour of the fencing nets fabric shall be as per the agreement between the buyer and the seller. The colour/shade shall be as specified in the contract or order. In case a sample has been agreed upon and sealed, the supply shall be made in conformity with the sample in such respects.



a = eyelet edge to edge distance across the width of fabric

b = eyelet to eyelet distance across the length of fabric

c = length of eyelet, across the width of the fabric

Fig. 1 Location of Eyelets Across Width and Length of the Fabric

## 6 TYPES

Based on the mass in g/m$^2$ and construction, the fencing nets are classified as follows:

a) *Type 1* — Having mass of 110 g/m², *Min* with Mono × Mono construction; and

b) *Type 2* — Having mass of 100 g/m², *Min* with Tape × Mono construction.

## 7 REQUIREMENTS

### 7.1 Dimensions and Mass

The fencing nets shall be made to the shade and dimensions as specified in the contract or order. The dimensions shall be determined by the method prescribed in IS 1954. The following tolerance shall be permissible for length, width and mass (g/m$^2$):

| *Dimension* | *Tolerance*, Percent |
|---|---|
| Length | +1 |
| | - 0 |
| Width | +1 |
| | - 0 |
| Mass, g/m$^2$ | + 6 |
| | - 0 |

**7.2** The fencing nets fabric shall confirm to the requirements specified in Table 1.

## 8 PACKING AND MARKING

### 8.1 Packing

The fencing nets shall be packed in roll form in length of 50 m or in bundle form or as agreed to between the buyer and the seller.

### 8.2 Marking

**8.2.1** Each fabric roll/bundle shall be marked legibly by affixing an identification tag/label with the following information:

a) Indication of the source of manufacture;

b) Type of fencing net;

c) Declared length and width of the fencing nets;

d) Mass per square meter of the fencing nets;

e) Batch No. and date of manufacture; and

f) Any other information desired by the buyer.

**8.2.2** *BIS Certification Marking*

The fencing net rolls/bundles conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the fencing net rolls/bundles may be marked with the Standard Mark.

**Table 1 Requirements of Fencing Nets Made from Monofilament Yarns**

( *Clause* 7.2 )

| Sl No. | Characteristic(s) | Requirement(s) | | Method of Test, Ref to |
|---|---|---|---|---|
| | | Type 1, Mono × Mono construction | Type 2, Tape × Mono construction | |
| (1) | (2) | (3) | (4) | (5) |
| (i) | Mass g/m$^2$, *Min* | 110 | 100 | IS 1964 |
| (ii) | Average breaking strength of fencing net fabric (Strip method, 325×50 mm test piece with gauge length of 200 mm), N, *Min*: | | | IS 1969 (Part 1) |
| | a) Warpway | 350 | 350 | |
| | b) Weftway | 400 | 350 | |
| iii) | Retention of breaking strength after UV exposure of 144 h, percent, *Min* | 85 percent of original actual value (fabric) | | Annex B and IS 1969 (Part 1) |
| iv) | Colour fastness to artificial light[1)] | 4 or better | | IS 105-B02 |
| v) | Bursting pressure, kgf/cm$^2$, *Min* | 12 | 12 | IS 1966 (Part 1) or<br>IS 1966 (Part 2) |

[1)] Applicable for coloured fencing nets only.

## 9 SAMPLING

### 9.1 Lot

All monofilament fencing nets rolls/bundles of same construction and type dispatched to a buyer against one dispatch note shall constitute a lot.

**9.2** Unless otherwise agreed to between the buyer and the seller, the number of fencing nets rolls/bundles to be selected at random from a lot shall be as given in column 3 or column 4 of Table 2.

## 10 NUMBER OF TEST SPECIMENS AND CRITERIA FOR CONFORMITY

Number of test specimens and criteria for conformity shall be as given in Table 3.

**Table 2 Scale of Sampling**

( *Clause* 9.2 )

| Sl No.<br>(1) | No. of Rolls/Bundles in Lot<br>(2) | Sample Size<br>(3) | Sub-Sample Size<br>(4) | Permissible No. of Defective Rolls/Bundles<br>(5) |
|---|---|---|---|---|
| i) | Up to 50 | 3 | 2 | 0 |
| ii) | 51 - 150 | 5 | 2 | 0 |
| iii) | 151 - 300 | 8 | 3 | 1 |
| iv) | 301 - 500 | 13 | 5 | 2 |
| v) | 501 and above | 20 | 5 | 3 |

**Table 3 Number of Test Specimens and Criteria for Conformity**

( *Clause* 10 )

| Sl No.<br>(1) | Characteristic<br>(2) | No. of Rolls/Bundles<br>(3) | Criteria for Conformity<br>(4) |
|---|---|---|---|
| i) | Materials, manufacture, dimensions and mass | According to column 3 of Table 2 | The defective rolls do not exceed the corresponding number given in column 5 of Table 2 |
| ii) | All other requirements | According to column 4 of Table 2 | All the test specimens shall pass the tests |

# ANNEX A

( *Clause* 2 )

## LIST OF REFERRED INDIAN STANDARDS

| *IS No.* | *Title* |
|---|---|
| 1954 : 1990 | Determination of length and width of woven fabrics — Methods (*second revision*) |
| 1964 : 2001 | Methods for determination of mass per unit length and mass per unit area of fabrics (*second revision*) |
| 1966 | Textiles — Bursting properties of fabrics — Determination of bursting strength and bursting distension |
| (Part 1) : 2009 | Hydraulic method (*second revision*) |
| (Part 2) : 2009 | Pneumatic method (*second revision*) |
| 1969 (Part 1) : 2018 | Textiles — Tensile properties of fabrics: Part 1 Determination of maximum force and elongation at maximum force using the strip method (*fourth revision*) |
| 105-B02 : 2014 | Textiles — Tests for colour fastness: Part B02 Colour fastness to artificial light Xenon arc fading lamp test |
| 16366 : 2015 | Glossary of terms used in agrotextile |

# ANNEX B

[ *Table* 1, *Sl No.* (iii) ]

## UV RESISTANCE TEST

### B-1 TEST SPECIMENS

The test specimens for breaking strength shall be cut from the sample as specified in IS 1969 (Part 1).

### B-2 TEST CONDITIONS

**B-2.1** The test shall be carried out with fluorescent UV-B lamp (313 nanometer or its equivalent).

**B-2.2** The duration of the test shall be 144 h (that is 6 days).

**B-2.3** The test cycle shall be 8 h at 60 ± 3°C with UV radiation alternating after 4 h at 50 ± 3°C with condensation.

**B-2.4** Irradiation level throughout the test shall be maintained at $0.63 \, ^{+0.03}_{-0.0}$ W/m².

### B-3 TEST PROCEDURE

**B-3.1** Determine the original average breaking strength of fencing nets specimens separately as per the test specified in IS 1969 (Part 1).

**B-3.2** Expose the specimens alternately to ultraviolet light alone and to condensation in one respective cycle.

**B-3.2.1** The type of fluorescent UV lamp, the timing of the UV exposure and the temperature of condensation shall be as specified in **B-2**.

**B-3.3** Determine the average breaking strength of the specimens separately after UV exposure as mentioned above.

**B-3.4** Determine the percent retention of original strength as follows:

$$\text{Percent retention of original breaking strength} = \frac{b}{a} \times 100$$

where,

$a$ = Average breaking strength before UV exposure as obtained in **B-3.1**; and

$b$ = Average breaking strength after UV exposure as obtained in **B-3.3**.

NOTES:

**1** The UV source is an array of fluorescent lamps (with lamp emission concentrated in the UV range).

**2** Condensation is produced by exposing the test surface to a heated, saturated mixture of air and water vapour, while the reverse side of the test specimen is exposed to the cooling influence of ambient room air.

# ANNEX C

( *Foreword* )

## COMMITTEE COMPOSITION

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## Amendments Issued Since Publication

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